

The Paulist Radio Station

REV. JAMES F. CRONIN, C.S.P.

THE Paulist Fathers of New York City have a five thousand watt radio station. It is known as WLWL. In the eastern part of the United States only WEAJ and WLWL are listed as five thousand watt stations. There are at present nearly twenty stations in the United States capable of using five thousand watts. At Pittsburgh there is a station using about ten thousand watts. At Bound Brook, New Jersey, and at Schenectady, New York, there are fifty thousand watt stations. They may be said to approach superpower, though the superpower broadcasting station has not yet arrived. Among radio engineers, however, it is considered probable that stations using one hundred thousand watts and perhaps even two hundred thousand watts will be rather common within a few years.

A few months ago experiments in England conducted at the Hilmorton Station, Rugby, proved that the human voice can make an eight thousand mile circuit and come back to the speaker within the twentieth of a second. Successful tests have been made between this station and Rocky Point, New York.

Behind a high power station there are thrills a plenty. A few weeks ago an officer of the U. S. Navy stepped into the Paulist Rectory and asked to see the radio transmitter. In an airship three thousand feet above Catalina Island, out in the Pacific Ocean, this officer, so he reported, heard distinctly every word of a sermon preached from the Paulist Church at New York. Again we open the mail, and read of a crew seventeen hundred miles out from Boston, in the Atlantic Ocean, enjoying a program over WLWL; and, here is another—from Cuba—telling us that our program came tearing into a receiving set and displaced a program that was being enjoyed. Mail from Nova Scotia, Prince Edward Island, and all along the Atlantic coast down to and including Cuba, reports reception of WLWL. Here is a question asked by a man from Georgia requesting an answer over the

radio, and further requesting that the answer be given slowly and distinctly since he has difficulty at times in clearly understanding the answers given during the Question Box period. There surely are plenty of thrills behind a high power station.

Disappointments there are also. A New York newspaper recently reported that within ten miles of a fifty thousand watt station there were "dead spots." Within ten miles of WEAJ and WLWL both stations experience the same difficulty. Evidently high power is not a cure for overcoming all dead areas. Again, in cities where local stations are broadcasting on a wave length near that of another station, and this today is true in practically every part of the country, not much success is had in tuning-in the distant stations, on account of interference from the local stations. For example, on a test program in the early morning hours WLWL is heard with almost as much volume as the local stations usually are in Baltimore, Philadelphia, and Providence, R. I. But on account of the local stations in these cities fans have the greatest difficulty in tuning-in our programs unless they have a very selective set.

The fact is that distant reception is seldom reliable and satisfactory, and at no time since the advent of broadcasting has this been as true as it is today, because of crowded conditions of assigned wave lengths. Broadcasters today appreciate this, and they are aiming at furnishing with good signal strength their programs to their local audience. Within a radius of ten miles from WLWL there reside about twelve million people. It is estimated that there are nearly 500,000 radio sets in the New York metropolitan district, and it is with this audience that we are, of course, primarily concerned. After all it may be interesting to know that several people three thousand miles from this station have listened to our programs, but it really does not count for much in our purpose. For WLWL is at present placing the message of Catholicism with great signal strength into the receiving sets of those residing within twenty-five miles. Of course the message is received by thousands living at much greater distance, and is received by them regularly and with fair signal strength. The advantage of a five thousand watt station over a lower power sta-

tion consists primarily in (1) having fewer dead spots and (2) giving more reliable and satisfactory service to listeners.

In fulfilling our purpose of bringing the message of Catholicism into these hundreds of thousands of homes we have this past year broadcast many educational programs. Twice a week, two periods of thirty minutes each, have been devoted to answering questions. We have insisted that only questions of general interest and concerning the teachings of the Catholic Church would be answered. Good use has been made of this opportunity both by Catholics and non-Catholics. In the last ten months we have received thousands of questions, and we are happy to say very many of them from non-Catholics who have expressed their appreciation of the enlightenment furnished them through this medium. Catholics, thousands of them, have clearly taught us by their questions that they know very little about their own religion. We are not sure whether this Question Box period has not benefited Catholics far more than it has enlightened non-Catholics about the teachings of our Faith.

Other efforts along educational lines were: Weekly talks under the auspices of the Study Club Committee of the National Catholic Welfare Conference; weekly talks under the auspices of *The Commonwealth* on Literature and Art; Lectures by Sir Bertram Windle on Evolution and Catholicism; Lectures on Psychoanalysis and Catholicism prepared by Reverend C. Bruehl; Lectures by Doctor Cooper of the Catholic University on Religion and Science; Lectures by Monsignor Joseph McMahon on Marriage and Divorce; Weekly Book Review, and dozens of other talks on subjects interesting to Catholics particularly.

On every Sunday evening the services from the Paulist Church are broadcast and this includes a sermon by preachers invited from all parts of the city. On one occasion, a Cardinal Mercier Memorial program brought to this station Right Reverend Bishop John J. Dunn, Bishop William T. Manning, Rabbi Stephen Wise and Mayor Walker, each of whom gave a brief address. Last, and greatest of all, WLWL has enjoyed the approbation and warmest encouragement from our Beloved Cardinal,

who has honored the station and its audience by appearing on two occasions before the microphone.

Radio fans, at least the great majority of them, prefer entertainment, vocal and musical, to educational talks. Obviously, musical programs are necessary to get and to hold an audience for talks on religion. Sandwiched in between the talks on Catholicism there must be features of an entertaining value. In New York City today competition among broadcasters is very keen. Features that have "tune-in value" are sought by all. If a Catholic broadcasting station is going to have regularly a large audience, it is forced to furnish musical entertainment of high quality. Big business seeing the great advertising possibility of the radio gladly pays hundreds of dollars for a thirty minute program in order to secure the good will of listeners for their business. If a Catholic station refuse to accept ads, then it is forced either to pay enormous sums for good talent which really is impossible, or to supply poor and mediocre programs. A station in New York today faces the alternative of accepting ads with high grade entertainment and a large audience or rejecting ads and having poor talent with a small audience, for no station can afford to pay forty or fifty thousand dollars a year for talent, and survive. WLWL has already accepted a few "good-will programs" and with this assistance, and the help of ten thousand members of The Paulist League, is furnishing with its educational talks musical programs of a nature that is unquestionably winning for it a very large audience.

Beginning September first, Catholic literature will be distributed on a large scale. It is our intention to offer over the radio, pamphlets and reading matter, free to those seeking information concerning the Church and her teachings. By this means we hope to bring the truth of Catholicism into the homes of people by the printed word as well as by the spoken word. Instruction received by listening to talks over WLWL will be supplemented by reading pamphlets in the home.

We began work on our station in January, 1925, and on September 24, 1925, Cardinal Hayes opened our first program on the air. The initial cost of the station was about \$80,000, and we figure that the annual maintenance will amount to \$40,000 or \$50,000.

Catholic Broadcasting

REV. PETER J. DOLIN, S.J.

THERE was a school debate, some twenty years ago, in which "we of the affirmative" maintained that "Nowadays, Oratory exercises a greater force for good than Journalism." One of the cogent arguments of the gentlemen of the negative which palpably confronted us in our preparation, and almost overwhelmingly in the rebuttal, was that the efforts of an orator were necessarily circumscribed. He could reach only the limited few who came within the sound of his voice, while the field of the journalist was practically unlimited, his influence for good as far-reaching as the world that runs and reads.

I may mention, incidentally, that the protagonists of the forum won the debate, not, of course, without a struggle. But were we to assemble tonight on that same college stage and reenact the scene, the victory would be ours, hands down. The opponents of oratory, who, in this modern day of radio, would intimate that the written word can carry farther than "the throbbing, pulsating plea of the orator," would be leaving altogether out of consideration the microphone, the transmitter, the aerial tower and the hundred and one other elements that have combined to revolutionize the transmission of the human voice and of artificial sounds.

Radio has changed the face of the earth. It has opened up possibilities which, even a generation ago, would have been deemed as ridiculous as were the prophecies of Mother Shipton. I suppose that, in the usual order of things, the Catholic Church, as the undying foe of scientific progress in general, has been cited, here and there, as an adversary of the radio, in particular. Yet in the atmosphere in which were reared the famous Ampère, a devout Catholic; Galvani, a Tertiary of St. Francis; Ohm, a teacher in a Jesuit College, and Volta, a man who began each day by hearing Mass, and ended it, after he had visited the Blessed Sacrament, by saying his Rosary, one would be disappointed not to find that the radio has its place in circles professedly Catholic, and that

it is serving as a veritable handmaid of the Catholic religion, in aiding the dissemination of Catholic teaching.

One of the first broadcasting stations in the United States—that which is now known as WEW—was installed at St. Louis University, in 1910, by Brother George Rueppel, S.J. Its pioneer efforts were only suspended with the entrance of the country into the war, when the Government utilized its facilities in the training of radio operators for the United States Signal Corps. With the removal of wartime restrictions, the station, in 1919, resumed its former programs, and in April, 1921, the scope of its usefulness was extended by the introduction of a radio-telephone for the transmission of the United States Weather Bureau reports, market and crop estimates. In March, 1924, WEW began to broadcast Sunday afternoon lectures on doctrinal subjects. The Divine Origin of the Church, the Marks of the Church, the Infallibility of the Pope, the Sacraments, the Priesthood, Confession, the Holy Eucharist, Marriage, etc., were among the topics which have been explained. Every Sunday afternoon at 2 o'clock, answers are given to the difficulties submitted by listeners. Thanks to the generosity of the Catholic Laymen's Association of Missouri, who have appropriated \$25,000 for the purpose, it is announced that WEW, heretofore a 100 Watt station, is now to have a 1,000 Watt transformer.

In the fall of 1921, the Rev. John B. Kremer, S.J., head of the Department of Physics at Marquette University, Milwaukee, outfitted, largely with equipment of his own making, a 100 Watt station at the University. Under his manipulation programs were broadcast once a week until a little over a year ago, when the power was increased to 1,000 Watts and the Milwaukee *Journal* combined with Marquette in operating the station. It is located in the tower of the new Science and Administration Building of the University, but remote control programs can be broadcast from the new \$2,000,000 plant of the *Journal* as well as from several other points throughout the city. WHAD operates on a wave-length of 275 meters, and with few changes could be readily increased to 1,000 Watts. The Marquette studio is on the air only on Monday nights, when, in addition to musical and other features, a talk is given on some current topic by the Rev.

Edward F. Garesché, S.J. Each day, at 11 A. M. and 4 P. M., the *Journal* studio broadcasts music, news, market reports and talks by prominent individuals. The "programs of quality" are advertised through the columns of the *Journal* and have elicited acknowledgments from the listeners in every State in the Union, and from points as remote as the Tahiti Islands, 6,000 miles from Milwaukee.

Credit for establishing the pioneer broadcasting station of the South belongs to Loyola University, New Orleans, which applied to the Government authorities, April 2, 1922, for a broadcasting license. Authority to operate was forthwith granted, and that same evening Louisianians who possessed radio sets heard the first radio concert ever given in the Southland. When the University launched its building campaign to raise \$1,500,000, the appeal which was made by wireless brought valuable results. Later the station enabled Loyola to open a Radio School. Completely rebuilt and brought up to date, WWL broadcasts regularly once a week, furnishing musical programs and incidental educational talks.

The Benedictine Fathers in charge of St. Martin's College, Lacey, Washington, "Out where the Cedars meet the Sea," received, in April, 1923, a broadcasting license for station KGY, the outgrowth of an Amateur Radio Telegraph station installed by Father Stanislaus Ruth, O.S.B., eight years previously, and interrupted in its operation only by the restrictions of war time. Three evenings each week a varied program is broadcast, with concerts, debates, plays, lectures, recitals and college news in variety. Although until very recently only a five Watt station—it is now operating on fifty Watts—twenty-three different States have been heard from in appreciation of the programs of KGY, with particular praise for the renditions of operas, etc., produced through the use of Victor Records, with supplementary explanations and descriptions. In this form of broadcasting the Fathers at St. Mary's were pioneers. Their unique station is housed in a log-cabin, which, like all of the apparatus used, was "home-made."

The next center to develop collegiate radio activity was Holy Cross College, Worcester, Mass., which began broadcasting in the fall of 1924, first with the news of

football games. Through the provision of its owner, Mr. Theodore T. Ellis, a generous benefactor of Holy Cross, the Worcester *Telegram and Gazette* utilized its station, WCTS (now WTAG) for the football program and later provided connections with the College Auditorium and the Students' Memorial Chapel. Thus the radio audience was enabled to enjoy all the lectures, organ recitals, glee club and orchestra concerts, intercollegiate debates, etc., intended primarily for the undergraduates' benefit. The following summer, under the supervision of the Rev. Daniel H. Sullivan, S.J., various points of the campus were linked by underground cables to a central control panel, and through the courtesy of the Westinghouse Electric and Manufacturing Company, the facilities of its stations at Springfield and Boston, WBZ and WBZA, were placed at the disposal of Holy Cross. Since last November, the College has radioed, one Sunday night each month, a full evening's program through WBZ, which will transmit Twelfth Night, the Shakespearian play scheduled for production this year. It is said that this is the first time that Shakespeare has been thus broadcast. And what again was claimed by press critics to be the first time such use has been made of the wireless, was when a debate was carried on, last May, between the teams representing Holy Cross and Boston College. This "duel of brains" was virtually staged on a platform forty-two miles wide, for the Worcester boys spoke into the microphone at WEAN, the Shepard Studio at Providence, R. I., while the Boston College debaters radiocast their arguments through WNAC, the Shepard Studio in Boston. The decision was rendered only after the listening public had submitted its vote, by telegram, telephone or letter. A total of over 1,300 ballots thus received, from Montreal, Washington, D. C., Cincinnati, and practically every city in New England, was significant of the widespread interest excited by the novel competition.

Newer than all the foregoing, and second to none in its equipment, is Station WLWL, opened last September by the Paulist Fathers at their headquarters, West Fifty-ninth Street, New York City. The station, with its twin towers two hundred and twenty-five feet high, is equipped to use 5,000 Watts, and represents an investment of over

\$80,000. Its installation was directed by the Rev. James F. Cronin, C.S.P., who is in charge of the plant and largely responsible for the refined and varied programs that have been broadcast, beginning with the evening when, according to press comments, an audience of at least one million listened to the opening address of His Eminence, Cardinal Hayes. WLWL is on the air five evenings each week. The Sunday program is a purely religious one, affording the listening public the incidental opportunity of hearing the world-renowned Paulist Choristers, whose efficiency as radio artists is attributed to the skill of their director, the Rev. William J. Finn, C.S.P. On Monday evenings one of the Paulist Fathers conducts a "Question Box" hour, supplemented by a discussion of civic or spiritual interest. Thursday evening is set apart for treatment of literature, public affairs and the arts. Reports have been forthcoming from all parts of the United States and from various provinces of Canada, of the efficiency of WLWL's broadcasting and of the grateful delight with which its services have been received.

An altogether distinct article might be written of the widespread use of the radio which has been made, here and there about the country, by arrangement with stations purely secular in their management, for the broadcasting of Catholic interests. Thus, in Chicago, on the second Sunday of January, Cardinal Mundelein was listened to, not merely by the members of the Holy Name Society before whom His Eminence appeared in his Cathedral, but by the thousands to whom the *Chicago Tribune* broadcast the services through its Station WGN. In the same city, for the past several years, the Rev. Claude Pernin, S.J., Professor of Homiletics in the Archdiocesan seminary, has been giving weekly readings in literature from KYW, a Westinghouse station.

Over the General Electric Company's Station KOA, at Denver, Colorado, January 31, the Pontifical Mass celebrated by Bishop Tihen in the Cathedral of the Immaculate Conception, the sermon by the Rector, an afternoon organ recital and, later in the day, the complete Vespers' service, were sent out on the air.

On February 6th, the first of a series of half-hour lectures to be given every Saturday night, by teachers in the

various faculties of Creighton University, Omaha, Nebraska, was broadcast through WOAW, the local station of the Woodmen of the World. Drama, fiction, athletics, public speaking, law, dentistry, medicine, sciences, etc., are to be treated from the popular viewpoint.

And so this thoroughly modern vehicle for the carrying of truth and enlightenment and spiritual cheer continues to grow in efficiency and practicability. Its advent has brought undreamed-of encouragement to those who would fain hearken to the mandate of Christ: "Preach the Gospel to every creature!" The possibilities of radio, as a factor for good, give even greater reason than did the invention of its predecessor in scientific achievement, for one to exclaim: "What hath God wrought!"

Catholics and Science

REV. F. A. MERNER

Reprinted from the Melbourne "Tribune"

TO set out in detail all that science owes to the children of the Church, would, of course, be impossible. Speaking on this matter, perhaps the most surprising thing for most people to hear would be that during the past nine centuries those who have taken a leading part in scientific research have not only been Catholics, but Catholic priests. The best proof of this is to be found in Poggenдорff's Biographical Dictionary of the Exact Sciences. In this authoritative work, there are the names of 8847 contributors to science from the beginning of the sixth century before Christ to 1863. The list embraces about twenty-five centuries. A great many of them were in pagan times, but in spite of this, more than ten per cent. of the names are those of Catholic ecclesiastics. This shows, of course, that a good number of priests must have devoted their leisure hours to the pursuit of science, and nearly a thousand reached distinction. Now, doubly absurd, then, appears the contention that the Church is bitterly opposed to scientific pursuits.

There is not a branch of modern science in which Catholics have not either distinguished themselves, or have been the real founders.

There is the name of Columbus in regard to geographical discovery; of Descartes in regard to pure mathematics, and that of Le Verrier to applied; of Galvani and Volta in connection with electricity, and Laviosier with chemistry. Haüy, a French priest, is the great name in mineralogy, and Stensen, a Danish convert, who became a bishop, was a discoverer in anatomy and a founder in geology. Who has not heard of the late lamented Louis Pasteur, the greatest Frenchman of modern times, who saved more lives by his discoveries than Napoleon killed by his wars? This great man has left landmarks in biology, in chemistry and physics, in medicine and surgery, in the important practical subjects of fer-

mentation, spontaneous generation, and sanitation which represent great advances in science, and starting points for new explorations into the yet unmapped domain of scientific knowledge. His work has changed the whole aspect of biology and medicine, and especially in its precious branches that refer to the cure and treatment of disease. And this great man has given, or rather is in himself, the most conclusive answer to the contention that there is an unappeasable warfare between science and religion, for he always preserved the simple faith of his boyhood's years. "The more I know," he said on one occasion, "the more nearly does my Faith approach that of the Breton peasant. Could I but know it all my Faith would doubtless equal that of the Breton peasant woman." As he lived, he died in 1895, with one hand grasping that of his wife, the other his crucifix. Finally, I must mention Gregory Mendel, an Austrian monk whose name has been in all the biological periodicals of recent years, and is famous in all the laboratories of biological science throughout the world. He discovered a law in heredity, which has done more to simplify all the problems in that science than all the observations and theories of the great workers in biology of the nineteenth century. Already it has revolutionized that science, and given the death-blow to Darwin's theory of Natural Selection. Though he published the results of his experiments in 1865, it was not until 1900 that their importance was recognized. As clearly stated by Professors Morgan and Castle, this was due to the general acceptance of the Darwinian theory. We may well, therefore, be on our guard against giving assent to any theory of modern science, however attractive, before it is demonstrated by facts.

THE GALILEO CASE

In the grand galaxy of inventors and discoverers, we find a single name which irreligious scientists and sectarian writers use as a sort of dummy, to represent the Church's opposition to the advancement of truth. Whenever an attack is made on the Church in the name of science, the name of Galileo, like a "King Charles' head," is sure to be dragged in. It is, however, as Cardinal Newman so well expressed it, the ONE exception that proves

the rule of beneficent patronage of science uniformly exercised by the Church Authorities. "It is," he says, "the one stock argument to the contrary." Catholics, as I observed at the beginning, have grown tired of explaining that the celebrated trial of this great Italian scientist is an historical incident almost entirely personal in character, an exception to the general rule of the relationship of the Popes to science, and absolutely no index of the policy of the Popes, or of the Church, to things scientific, and above all, to astronomy.

The plain facts of the Galileo case are these. Galileo Galilei, the great Italian physicist, was born at Pisa, 1564. His talents and happy discoveries soon won renown, but it is more on his work as a physicist than as an astronomer that his lasting fame is based. By his use of the telescope, which had just been invented in Holland, he made some of his most important astronomical discoveries, as, for instance, the satellites of Jupiter. When he paid a visit to Rome in 1611, he was received with the highest honor, the Jesuits giving a special reception at the Roman College. In one of his letters from that city he writes: "I have received marked favors from many Cardinals and prelates here, and from several princes. They wanted to hear of my inventions and were all pleased." This shows in what esteem science was then held in Rome.

In 1612, however, he published a treatise on sun-spots, in which he declared unreservedly for the Copernican theory, that the sun is stationary, the center of the universe and the Earth merely a planet revolving round it. Nicholas Copernicus, born in 1473, was a Polish Catholic clergyman and a Canon of the Cathedral of Frauenberg, whose great glory is to have found out and to have persevered on the right road to the solution of the problem of celestial mechanics. His great work "On the Revolutions of the Heavenly Bodies," which was to revolutionize the science of astronomy, was not published till he lay on his death-bed, in 1543, and was dedicated, by permission, to Pope Paul III. The Lutheran publisher, Oslander, without the knowledge of Copernicus, put in a preface which set forth that the new system was only an hypothesis. This he did for fear of his fellow Lutherans, who showed themselves to be bitter opponents of Copernicus and his doctrine. This theory found many defenders in

Italy, among others the Jesuit, Father Clavius, to whom Pope Gregory XIII entrusted the Reformation of the Calendar, in 1578. Pope Gregory, I may mention in passing, had a tower erected in a portion of the Vatican gardens, fitted out with the greatest and most efficient astronomical instruments of the time. There he held the meetings of the learned men who were consulted on the reform of the calendar. The tower stands to this day, a witness to the munificence of its founder, as well as to the ignorance of Professor Huxley.

For seventy years the Copernican theory continued to be taught without meeting with any opposition from the Church. We must remember that it was only as yet a theory, without any definite scientific proofs. The geocentric theory still held possession of the field, and had most able defenders, including the celebrated astronomer Tycho Brahe, who had just explained away its apparent difficulties, most plausibly. Galileo now appeared on the scene, and like some of the defenders of the theory of evolution at the present day, boldly proclaimed the theory not as an hypothesis, but as a proved fact, and violently denounced all those who opposed him as fools and ignoramuses. The proofs that he set forth were, of course, of no value, and it was not till sixty years afterwards that the Copernican theory was proved by Newton's Principia, and was then generally accepted. Galileo's attack, therefore, raised a hornet's nest about his ears. His opponents appealed to Scripture against him, especially to the passage where Joshua makes the Sun stand still. Galileo replied, and rightly as we know, now, that the Scripture was wrongly interpreted, so the matter was brought before the Sacred Congregation of the Index, and Galileo hastened to get a decision in his favor. That the Congregation took the matter up with obvious reluctance is evident, and Galileo received an unofficial warning "to keep out of the sacristy," to confine himself to scientific reasoning and to leave the Scriptures alone. However, in spite of the admonitions of his friends, he still pursued the matter with indiscreet zeal and practically invoked a decision. Had scientific proofs been brought forward, of course, theological difficulties would have been cleared away, but Galileo had no scientific proof, and what there was of it perhaps, he failed to offer. The right of the Congregation to take up

the matter cannot be denied, for, although the question was one of natural science, yet, by introducing theology and Scripture, it had assumed the character of doctrine and exegesis. Owing, too, to the Protestant principle of the right of private interpretation, the Church at this period, was especially suspicious of any attempt at interpreting the Sacred Scripture, on the part of the laity. It was an extremely difficult position for the Congregation to be in.

That it made a wrong decision we of course must admit, for it endeavored to make a church institution the judge of scientific truth, a function altogether alien to its character, which it was not competent to exercise. The fact that this was the only time that this was done goes to show that it was an unfortunate incident but not a policy; and this incident has indeed made it impossible for the like to ever occur again. Commenting on this incident, in his article in the English Encyclopedia, Professor Augustus De Morgan, an authority not likely to be partisan, expresses this conclusion: "The Papal power must have on the whole been moderately exercised in matters of philosophy if we may judge by the great stress laid on this one case of Galileo. He is the ONE standing proof that an Authority that has lasted a thousand years was all the time occupied in checking the progress of thought." There is, of course, no question of infallibility involved in the decision of the Congregation, for no one has ever claimed infallibility for its decrees. Besides, as we have seen, there was really no question of faith or morals, but only of presumed wrong interpretation of Scripture in connection with a scientific matter. Galileo was cautioned by Cardinal Bellarmine, by order of the Holy Congregation not to adhere to or to teach any longer the Copernican theory, and he submitted to this order and promised to obey. It also prohibited by a decree, never confirmed by the Pope, March 5, 1616, all books defending the Copernican system, declaring the doctrine to be against the sense of Scripture. Even the work of Copernicus fell under the ban, "until it should be corrected." A decree of 1620 pointed out the corrections to be made. They were a few trivial alterations where he speaks of the new system as an established truth.

That the condemnation was not meant for science in

itself was quite understood by contemporary scientists. The great Lutheran astronomer, Kepler, wrote: "By their imprudent acts, some have caused the work of Copernicus to be condemned, after it had been left unmolested, for nearly eighty years, and the prohibition will last at least till the corrections are made. I have, however, been assured by competent authority, both ecclesiastical and civil, that the decree was not intended to put any hindrance in the way of astronomical research." Galileo obeyed the decree for about sixteen years. In 1623 his friend and patron, Cardinal Barberini, was elected to the Papal Chair, and became Pope Urban VIII, and the next year Galileo went to Rome to congratulate him, and was received with every mark of honor. The Pope publicly praised him for his distinguished learning and exemplary piety, and granted him a pension which was paid till his death in 1642. All his efforts, however, to have the decree of 1616 revoked, failed. In 1632, however, he published at Florence his "Dialogue on the Two Most Important Systems of the World." It contained an open but by no means complete defence of the Copernican system, and thus was a flagrant violation of the command given to him personally. The Inquisition took the matter up and cited him to Rome, and he came very reluctantly in 1633. He was declared suspect of heresy and ordered to retract on oath. This he did, and was sentenced to incarceration at the pleasure of the tribunal, and by way of penance was enjoined to recite the penitential psalms once a week for three years. The sentence, however, did not receive the customary Papal ratification. The legend, according to which Galileo rising from his knees after repeating the formula of abjuration, stamped on the ground, and exclaimed, *Eppur si muove*, says the article in the Encyclopaedia Britannica, "is, as may readily be supposed, entirely apocryphal."

The pathetic stories of his prison chains and torture, and his blinding in the dungeons of the Inquisition, are likewise only products of vivid imaginations. He was never for a moment in a real prison. He was allowed to go to his friends in Rome, and then to Sienna, and in five months he was allowed to go back to his villa near Florence, where he devoted himself to physics, publishing in 1638 his "Dialogue on the new Sciences," which he

rightly pronounced to be his best effort, and by which he became the founder of the Science of Dynamics. He died in 1643, fortified by the Last Sacraments, and by the blessing of his friend, Pope Urban VIII. Undoubtedly, Galileo had nothing in common with the champions of that unbelieving freedom of science, which now tries to set him up on its shield as a martyr of science. We may say without fear of contradiction, that apart from its theoretical error, the Congregation had shown the greatest possible indulgence towards one who had displayed such great contumacy. Non-Catholics as Leibnitz, Guizot, Eichorne, Raumer, Ranke and others who have studied the facts, acknowledge that Galileo trifled with the Authority to which he professed to submit, and was punished for obstinate contumacy, not for heresy. Even our friend, Professor Huxley, writing from Rome to St. George Mivart, said in his usual supercilious style: "I have been looking into the case of Galileo whilst on the spot, and have come to the conclusion that the Pope and the College of Cardinals had rather the best of it."

COPERNICUS AND KIRCHER

The best answer to those who exaggerate the significance of the Galileo incident is to set forth what the Church and Catholic Churchmen have done for science and especially for astronomy. We may point out that even after the condemnation of Galileo no scruple was felt, on disciplinary grounds, in teaching the new theory in Catholic colleges. Thus, in 1634, leave was given to introduce instruments based entirely on the Copernican theory, for the teaching of astronomy in Rome. In 1639 and in 1645, Bulialdus and Gassendi, both Catholic priests, undertook the defence of the Copernican system, and were neither reprimanded for it nor suspected of heretical teaching, and many a similar incident could be quoted. Two years after the condemnation of Galileo, one of the greatest scientists of the seventeenth century was summoned to Rome, the Jesuit Athanasius Kircher, who continued to write and experiment in all branches of science, with the approbation and constant patronage of the Popes, whose generous liberality enabled him to make Rome the greatest center of scientific interest during this century.

To him we owe the first definite statement of the germ theory of disease, and he was the originator of the modern museum. He wrote on such varied subjects as acoustics, astronomy, chemistry, geology, metallurgy, mineralogy, and zoology. The work done by Kircher could never have been accomplished but for the sympathetic interest of those who are said to have been bitterly opposed to all progress in the natural sciences, but whose opposition was really limited to theoretical inquiry that threatened, as has scientific theory so often since, to show itself directly contradictory to revealed truth.

It is amusing, in the face of the storm of vituperation which the case of Galileo has brought upon the Church, to see how men of science were treated by the reformers of this period. Francis Bacon, the alleged Father of experimental science, would have nothing to do with the Copernican theory. Melancthon had already referred to the new theory "as an absurdity, the production of an imbecile, or of one trying to gain notoriety." Luther spoke of Copernicus as "an upstart astrologer who strives to show that the earth revolves—not the sun. . . . This fool," he says, "wishes to reverse the whole science of astronomy." Galileo has been styled a martyr of science, but, as a matter of fact, all the martyrs of science have met their persecutors outside the Church, as did the great Lutheran astronomers Keppler and Tycho Brahe.

PSEUDO-SCIENTISTS

Unfortunately, a great deal of what is known as modern science, as taught by self-styled advanced thinkers, does not deal with facts and phenomena at all, but is mere speculation. There is nothing positive about it, and it has been well said that this modern science is but the opinions of the popular scientists of the day who have rejected the theories put forward with such dogmatism by those of yesterday, and whose "infallible" decisions will meet with a similar fate from their successors of to-morrow. Such science is but the vain and godless imaginings of "men who fail to see that which is, and imagine that which is not." The foundation of all their theories is a hatred of the Church, a hatred of Christianity, a hatred of God. The difficulties they are constantly bringing forward

against the consistent acceptance of Revelation are principally of two classes; those drawn from discoveries in geology and astronomy; and those rendered plausible by recent studies in biology. They are chiefly directed against the first chapter of the Bible, in regard to the age of the world, and the origin and antiquity of man. They all serve to show the intense dogmatism, the utter want of logic, and the extraordinary ignorance of these professors of modern science. Any argument, no matter how unscientific or unphilosophical, provided it is anti-Christian, is acceptable to these advanced thinkers, who are animated not by a love of science, but by an insane hatred of Almighty God.

In reality these atheistical men of science, of whom we hear so much, and to whom a deluded public attributes all the glory of the advances made in the various sciences, have little else but *theories*, and have coolly appropriated the observations and discoveries of those quiet persevering, successful workers whose names scarcely reach the public ear. These indeed are the true torch-bearers of science, alike distinguished for the fervor of their religious convictions, as they are eminent for their scientific attainments. Their names are enshrined forever in the sanctuaries of their Faith, and the halls of Science resound with the story of their achievements. From Gerbert, in the tenth, Albertus Magnus and Roger Bacon in the thirteenth century, they stretch in an unbroken line to Pasteur and Mendel in our own times, the foremost champions in defence of scientific truth, because they were armed with the certainty that whatever advances they might make in scientific truth, they rested secure on the impregnable rock of the Church's teaching, because truth cannot contradict truth.

On the other hand, where now are the proud unbelievers of the past who fondly imagined they could overthrow the Church, and by their much vaunted theories prove the foolishness of her doctrines? They are swallowed up in oblivion. And the same fate awaits the crack-brained theorists, and the unbelieving scientists of the present day. Their names will soon be forgotten, and their cherished theories to which so much importance is now attached by an uncritical public, will but give place to others that will, in their turn, be followed for a time, by

those who say in their heart, with the fool of Holy Writ: "there is no God." While with all this change of theory the practical works of the Catholic scientists will remain, continually augmenting human knowledge, and contributing to the well-being of mankind.

In a word, the Church can do without Science, but Science cannot progress without religion. In the words of Pope Leo XIII: "Reason plainly teaches that verities divinely revealed and natural truth cannot be in real conflict with each other, that whatever is at variance with revealed truth is by that very fact false. For this very reason, therefore, the divine magisterium of the Church is so far from impeding scientific research, or in any way retarding the progress of enlightenment, that it brings to them rather an abundance of light and the security of protection."

Secured from error and illumined by the light of Faith, is it any wonder that Catholic scientists have accomplished so much in the past, and look forward to still greater achievements in the future.